

**FEB 758: FLUID POWER SYSTEMS (60 HOURS)
COURSE OUTLINE**

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Introduction

Fluid Power Systems course is designed to provide the students with the principles and science of power transmission using fluids (oil and air). Fluid power is the technology that deals with the generation, control and transmission of forces and movement of mechanical element or system with the use of pressurized fluids in a confined system. Both liquids and gases are considered fluids. Fluid power system includes a hydraulic system (*hydra* meaning water in Greek) and a pneumatic system (*pneuma* meaning air in Greek). Oil hydraulic employs pressurized liquid petroleum oils and synthetic oils, and pneumatic employs compressed air that is released to the atmosphere after performing the work. This course has been designed to present the principles and design methodology of fluid power transmission and control components and systems at a postgraduate level.

Contents

- Study of the principles and design methodology of fluid power transmission and control components and systems;
- Emphasis on dynamic analysis with laboratory and computer simulation demonstrations
- Advanced mathematical models
- Empirical studies
- Computer applications

Mode of Delivery

Lectures

Tutorials

Problem solving assignments

Examination and assignments

Final Examination	70 Marks
Class presentations and assignments	20 Marks
CAT	10 Marks

Week	Topic	Hours	Mode of delivery
1-3	Module 1: i. Principles of Hydraulics and Pneumatics ii. Hydraulic systems fluids and their properties iii. Governing Laws and Principles iv. Fluid Power v. Pumps and motors	15	Lecture and class exercises
4-6	Module 2 i. Hydraulic Actuators ii. Control Systems, valves (Directional, flow, pressure) iii. Mathematical Analysis of control systems (Valves) iv. Proportional Control Valves v. Servo Valves	15	E learning platform
6-9	Module 3 i. Hydraulic circuit design and analysis ii. Accumulators iii. Hydraulic System Accessories	15	Class exercises
10-12	Module 4 i. Pneumatic systems ii. Pneumatic actuators iii. Pneumatic controls iv. Pneumatic circuit design using PLC v. Laboratory Exercises	15	Class exercises
13	Examination	2	Classroom